

**MITIGATION MONITORING REPORT  
CLARKSVILLE MARINA AT LIBERTY PARK  
CLARKSVILLE, MONTGOMERY COUNTY, TENNESSEE**

**Submitted to;**

**TENNESSEE DEPARTMENT OF ENVIRONMENT & CONSERVATION**

**Permit # 08.280**

**And**

**U.S Army Corps of Engineers**

**Permit # 2007-02398**

**Prepared For;**

**Mayor Kim McMillan**

**City of Clarksville**

**One Public Square**

**Clarksville, TN 37040**

**By:**

**Kevin Cowling**

**Manager of Operations and Planning**

**Clarksville Parks and Recreation**

**102 Public Square**

**Clarksville, TN 37040**

**October 31, 2012**

October 30, 2012

Mr. Mike Lee, Biologist  
Division of Water Pollution Control  
7<sup>th</sup> floor, L&C Annex  
401 Church Street  
Nashville, TN 37243-1534

Ms. Lisa Morris, P.E  
U.S Army Corps of Engineers  
Nashville District, Regulatory Branch  
3701 Bell Road  
Nashville, TN 37214

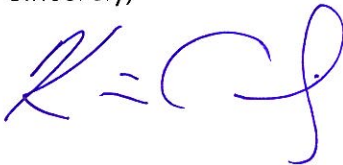
**RE: NRS 08.2810 and corps permit No. 2007-02398  
3<sup>rd</sup> Annual Monitoring Report; Cumberland River Mile 127.2R  
Clarksville Marina at Liberty Park, City of Clarksville, Montgomery County, Tennessee**

Dear Mike and Lisa:

I, on behalf of the City Forester, and the City of Clarksville, am pleased to submit the 3<sup>rd</sup> Annual Mitigation Monitoring Report. The off-site mitigation was complete in 2009 and planted the winter of 2010. The onsite mitigation was complete the fall of 2011.

If you have any questions or need additional information, please feel free to call me at 931-645-7476.

Sincerely,



Kevin Cowling  
Manager of Operations and Planning

Enclosures

Cc: Mr. Hatem Shah, City of Clarksville (w/ attachment)  
Ms. Jessie Fink, JJR, LLC (w/ attachment)

**Permittee**

Mayor Kim McMillan  
City of Clarksville  
One Public Square  
Clarksville, TN 37040

**Report Author**

Kevin Cowling  
Manager of Operations and Planning  
102 Public Square  
Clarksville, TN 37040

**I. Project Overview**

On June 1, 2009, the Tennessee Department of Environment & Conservation (TDEC) issued Section 401 Water Quality Certification to The City of Clarksville for the proposed alteration of 6.655 acres of jurisdictional wetland and 1,104 linear feet of stream. Subsequent to TDEC approval, the Nashville Engineer District issued a Department of the Army (DA) Permit (File No. 2007-02398) on July 7, 2009, for the excavation of approximately 23 acres of recessed basin. Stream impacts will involve the excavation of 846 linear feet of a perennial unnamed stream and 258 linear feet of an intermittent stream. Wetland impacts will involve the excavation of roughly 6.134 acres of jurisdictional wetlands and the filling of 0.521 acres, or 6.655 acres total. Compensatory mitigation for the wetland and the stream will be both on and off site. The offsite mitigation has occurred at the Hodges tract and the Grimes tract adjacent to the Tennessee Wildlife Resources Agency Shelton Ferry Wildlife Management Area, located at Cumberland River mile 140.5, approximately 13 miles upriver of the marina site. Mitigation at the Hodges tract involves restoration on two types of hydric soils and creation on three types of non-hydric soils resulting in a total of 8.715 acres of wetland credit on the 26.3 acre tract.

The mitigation and monitoring duties have since been turned over to the City of Clarksville, Forester, whom is located within the Parks and Recreation Department and subsequent reports will be filed by this position.

The project is located in Liberty Park, 1190 Cumberland Drive (US Highway 48/SR-13) in Clarksville, TN approximately 0.25 miles south of the intersection with Riverside Drive; at Cumberland Drive mile 127.5. The site is bounded by Zinc Plant Road to the south, Cumberland Drive to the east, west, northwest and private property on Riverside Drive to the north/northeast.

Offsite mitigation area is located at the Hodges tract and the Grimes tract adjacent to the TWRA Shelton Ferry Wildlife Management Area located at Cumberland River mile 140.5 which is 13 miles upriver of the existing marina.

## II. Permit Requirements

As previously stated, TDEC and the Corps issued permits for the proposed project covering impacts to the waters of the U.S and Tennessee. The permit required the permittee to provide annual Mitigation Monitoring Reports for the mitigation project for a period of five years.

The following specific requirements set forth by ARAP and Corps permits are presented in table 1.

**Table 1: Permit Requirements pertaining to off site mitigation**

401 and 404 Permit Requirements	Permit Condition	Completion Date
Mitigations shall consist of earthen berms, redirection of ditches into the site and shallow excavation.	#12 Corps  #12 TDEC	Fall 2009
The permittee shall plant the offsite wetland mitigation area with bare root native wetland species. No one species shall comprise more than 20% of the total. Tree planting should occur from late November to approximately March 15. All trees shall be guaranteed at a 75% survival rate for five consecutive years.	#13 Corps  #13 TDEC	Winter 2010
The offsite mitigation wetland shall be monitored and annual reports submitted to TDEC and to the COE for five years. The a 7 <sup>th</sup> and 10 <sup>th</sup> year tree survival monitoring will be conducted on the offsite mitigation with reports submitted to TDEC and the Coe. The mitigated wetlands shall at a minimum meet PFOIA criteria, a 70% survival rate of planted trees and an herbaceous areal coverage of approximately 70% of the species FAC or wetter at the end of five years.	#15 Corps  #15 TDEC	September 2010
It shall consist of the planting of a 100' buffer of 1950' of the Cumberland River bank on the Hodges tract. The trees shall include a combination of sycamore (200), red maple (200), green ash (200), pin oak (200), and black walnut (200). All bare root seedlings with no one species comprising more than 20% of the total.	#20 Corps  #20 TDEC	Winter 2010
Offsite stream mitigation on the Grimes tract shall consist of the placement of the channel back into its original channel. This require the purchase of 11.38 acres, removal of the tire dump blocking the channel and reconstructing the incised channel back to grade with the installation of rock cross vanes and log dam structures. Any trees lost by construction activities shall be replaced.	#21 Corps  #21 TDEC	Fall 2009
All stream mitigation shall be monitored with annual reports submitted to TDEC. The report shall document tree survival, species list of volunteer herbaceous and woody species, bank stabilization and in-stream habitat and substrate stability. The new stream shall meet the following criteria: <ul style="list-style-type: none"> <li>(a) 75% survival rate of planed trees for five (5) consecutive years.</li> <li>(b) A stable, morphological functioning channel with contained base flow in a discernible bed and bank in a riffle/pool complex.</li> </ul>	#22 Corps  #22 TDEC	October 2010

### III. Summary Data

Parks and Recreation department employees Kevin Cowling (Manager of Operations and Planning) and Mark Tummons (Director) performed the offsite mitigation monitoring on October 29, 2012. The reconnaissance of the mitigation sites was performed to determine the condition of the installed in-stream mitigation structures and tree plantings. Table 1 provides a description of the special conditions pertaining to offsite mitigation. Tables 2,3,4 & 5 provide a list of trees and shrubs planted within the mitigation areas.

**Table 2: Hodges Tract on South Side of Locke B Road (Area 2 – Wetland)**

	<b>Plot #1</b>	<b>Plot #2</b>	<b>Plot #3</b>
Plot size	60' x 60'	60' x 60'	40' x90'
Location	Northern corner	Southern end of north excavation pit	Southern corner of site close to berm
<b>Trees</b>	<b>Number of trees counted</b>		
Red Maple ( <i>Acer rubrum</i> )	0	0	0
Pin ( <i>Quercus palustris</i> )	0	13	8
Sycamore ( <i>Platanus occudentalis</i> )	52	22	0
Black willow ( <i>Juglans nigra</i> )	22	3	0
Cottonwood ( <i>Populus deltoids</i> )	48	25	0
Willow oak ( <i>Quercus phellos</i> )	12	7	21
Sweetgum ( <i>Liquidambar styraciflua</i> )	1	0	0
Green ash ( <i>Fraxinus Pennsylvania</i> )	152	15	1
<b>SHRUBS</b>	<b>Number of shrubs counted</b>		
Buttonbush ( <i>Cephalantus occidentalis</i> )	1	0	0
Silky Dogwood ( <i>Cornus amomum</i> )	0	0	0
<b>Total Individuals Counted</b>	<b>288</b>	<b>85</b>	<b>30</b>
<b>#/acre</b>	<b>3,486</b>	<b>1,029</b>	<b>363</b>

**Table 3: Transects at Hodges Tract on South Side of Lock B Road (Area 2 – Wetland)**

	<b><u>Transect 1</u></b>	<b><u>Transect 2</u></b>	<b><u>Transect 3</u></b>	<b><u>Transect 4</u></b>
<b><u>Size</u></b>	200'	200'	100'	100'
<b><u>Location</u></b>	Eastern edge of North Excavation Pit	Eastern edge of North Excavation Pit	Middle on the West Side	Middle on the West Side
<b><u>Trees</u></b>	<b><u>Number of trees counted</u></b>			-
Red Maple ( Acer rubrum)	0	0	0	0
Pin Oak (Quercus palustris)	2	5	5	6
Sycamore (Platanus occidentalis)	0	6	0	0
Black Willow (Juglans nigra)	11	1	1	0
Cottonwood( Populus deltoides)	15	17	0	0
Willow Oak( Quercus phellos)	14	5	3	1
Sweetgum (Liquidambar styraciflua)	0	0	0	0
Green Ash (Fraxinus pennsylvania)	0	10	0	0
<b><u>Shurbs</u></b>	<b><u>Number of shurbs counted</u></b>			-
Silky Dogwood (Cornus amomum)	0	0	1	0
<b><u>Total Individuals counted:</u></b>	<b>42</b>	<b>44</b>	<b>10</b>	<b>7</b>
<b><u>#/ Acre:</u></b>	<b>915</b>	<b>959</b>	<b>438</b>	<b>306</b>

**Table 4: Winterberry Plots, Hodges Tract (Area 2 – Wetland)**

<b><u>Tree Planted</u></b>	<b><u>Number Planted</u></b>	<b><u>Number Living Seen</u></b>	<b><u>Comments</u></b>
Winterberry(Ilex verticillata)	50	12	24% survival

**Table 5: Trees planted on the north side of Lock B Road by Cumberland River (Area 1)**

<b><u>Tree Planted</u></b>	<b><u>Number Planted</u></b>	<b><u>Plot 1 (60'x60')</u></b>	<b><u>Comments</u></b>
Sycamore( <i>Plantanus occidentalis</i> )	200	53	
Red Maple ( <i>Acer Rubrum</i> )	200	29	
Green Ash ( <i>Fraxinus pennsylvania</i> )	200	149	
Pin Oak ( <i>Quercus palustris</i> )	200	0	
Black Walnut ( <i>Juglans nigra</i> )	110	3	
<b><u>Total Individuals counted:</u></b>		<b>249</b>	
<b><u>#/ Acre:</u></b>		<b>2833</b>	
<b><u>Volunteer Trees</u></b>			
Boxelder ( <i>Acer negundo</i> )	0	173	
Silver Maple ( <i>Acer saccharinum</i> )	0	0	
American Elm ( <i>Ulmus Americana</i> )	0	51	
Cottonwood ( <i>Populus deltoids</i> )	0	7	
Black Locust ( <i>Robinia pseudoacacia</i> )	0	10	
<b><u>Total Individuals counted:</u></b>		<b>475</b>	
<b><u>#/Acre:</u></b>		<b>5750</b>	

#### **IV. Photo Summary**

A photo summary is attached documenting the mitigation work and success at the Grimes and Hodges Tracts.

#### **V. Results and Conclusions**

Grimes tract – Stream Mitigation

The in stream measures that were put in place (rock vanes, coir rolls and log structures) that were installed to improve and stabilize stream conditions are still in place and functioning. The wash out noticed in previous reports seems to be holding well and no further wash out was observed, therefore the measures taken are still meeting the intentions of what they were placed to do. The log drop structures remain unchanged from the last report.

#### Hodges Tract – Stream and Wetland Mitigation

##### Vegetation and Assessment Tree Plantings

The tree species listed in Tables 2, 3, 4, &5 along with a few shrub species were observed within the mitigation area. A photographic summary showing conditions at the site during the October visit is included as an attachment. The photos will show the extensive amount of volunteer woody vegetation found throughout the entire area. This is the area that was planted with a riparian buffer along the Cumberland River for additional stream mitigation.

The tree planting continue to be successful but counting proved difficult due to the large and vast amount of volunteer vegetation that is documented further in the photographic summary. Pin oaks remain as the most identifiable throughout the plot. Most of the planted and native seedlings on site have grown to be in the 6-10 foot range (note the original seedlings planted ranged from 2-3 foot in height).

The wetland mitigation site continues to be dominated by emergent vegetation throughout the area and in the borrow areas. Dominant vegetation includes, but is not limited to spike rush, various sedges, yellow water buttercup, golden rod, and green bulrush.

##### Hydrological Monitoring

Although there were three piezometers installed in Area 2 on the south side of Lock B Road, none could be located due to the heavy vegetative state of the site. Therefore no water measurement, if any, could be taken.

The hydrological parameters of the site have been met yearly since the establishment of the mitigation area. Upon the site visit there are obvious areas of water settlement with the ground remaining soft and wet in several areas throughout the site south of Lock B Road. The most significant area of water settlement is directly in front of the berm area so it is safe to say that these continue to function in the way they were intended.

In summary, it appears that the mitigation areas continue to function as planned from the start and all evidence shows that the areas mitigated will continue to thrive with planted seedlings as well as volunteer vegetation on site.

## ATTACHMENTS

**Photo summary – Annual mitigation monitoring report**

**City of Clarksville, Liberty Park**



**Photo 1 – 1 of 12 remaining winterberry shrubs planted on the east side of the eastern berm**

**Date – October 29, 2012. Photo taken by Kevin Cowling**



**Photo 2 – On the eastern berm looking south with a pin oak in view**

**Date – October 29, 2012. Photo taken by Kevin Cowling**

**Photo summary – Annual mitigation monitoring report**



**Photo 3 – Picture of heavily vegetative area looking west from Lock B Road**

**Date – October 29, 2012. Photo taken by Kevin Cowling**



**Photo 4 – Picture of volunteer Silver Maples looking north from eastern berm**

**Date – October 29, 2012. Photo taken by Kevin Cowling**

**Photo summary – Annual mitigation monitoring report**



**Photo 5 – Photo looking south on northern section of the tract of native tree, with evidence of a “deer rub” showing wildlife inhabiting the mitigated wetlands**

**Date – October 29, 2012. Photo taken by Kevin Cowling**



**Photo 6 – Photo showing “volunteer” silver maple on southern point of tract (height approx 6 ft)**

**Date October 29, 2012. Photo taken by Kevin Cowling**

**Photo summary – Annual mitigation monitoring report**



**Photo 7 – On eastern berm facing south, native cotton wood tree, approx height 10 ft**

**Date – October 29, 2012. Photo taken by Kevin Cowling**



**Photo 8 – On south east corner of tract looking north east, areas of water settlement, soft ground no standing water observed**

**Date – October 29, 2012. Photo taken by Kevin Cowling**